

# SEQUENCE LISTING

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<120> MALATHION CARBOXYLESTERASE

<130> Attorney Docket No. 50179-051

<140> 09/068, 960

<141> 1998-06-20

<150> PCT/AU96/00746

<151> 1996-11-22

<150> AU 6751

<151> 1995-11-23

<160> (43) ✓

<170> PatentIn Ver. 2.0

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 260 265 270  
 Asp Asn Asp Lys Asp Val Leu Glu Phe Leu Met Lys Ala Lys Pro Gln  
 275 280 285  
 Asp Leu Ile Lys Leu Glu Glu Lys Val Leu Thr Leu Glu Glu Arg Thr  
 290 295 300  
 Asn Lys Val Met Phe Pro Phe Gly Pro Thr Val Glu Pro Tyr Gln Thr  
 305 310 315 320  
 Ala Asp Cys Val Leu Pro Lys His Pro Arg Glu Met Val Lys Thr Ala  
 325 330 335  
 Trp Gly Asn Ser Ile Pro Thr Met Met Gly Asn Thr Ser Tyr Glu Gly

340

345

350

Leu Phe Phe Thr Ser Ile Leu Lys Gln Met Pro Met Leu Val Lys Glu  
355 360 365

Leu Glu Thr Cys Val Asn Phe Val Pro Ser Glu Leu Ala Asp Ala Glu  
370 375 380

Arg Thr Ala Pro Glu Thr Leu Glu Met Gly Ala Lys Ile Lys Lys Ala  
385 390 395 400

His Val Thr Gly Glu Thr Pro Thr Ala Asp Asn Phe Met Asp Leu Cys  
405 410 415

Ser His Ile Tyr Phe Trp Phe Pro Met His Arg Leu Leu Gln Leu Arg  
420 425 430

Phe Asn His Thr Ser Gly Thr Pro Val Tyr Leu Tyr Arg Phe Asp Phe  
435 440 445

Asp Ser Glu Asp Leu Ile Asn Pro Tyr Arg Ile Met Arg Ser Gly Arg  
450 455 460

Gly Val Lys Gly Val Ser His Ala Asp Glu Leu Thr Tyr Phe Phe Trp  
465 470 475 480

Asn Gln Leu Ala Lys Arg Met Pro Lys Glu Ser Arg Glu Tyr Lys Thr  
485 490 495

Ile Glu Arg Met Thr Gly Ile Trp Ile Gln Phe Ala Thr Thr Gly Asn  
500 505 510

Pro Tyr Ser Asn Glu Ile Glu Gly Met Glu Asn Val Ser Trp Asp Pro  
515 520 525

Ile Lys Lys Ser Asp Glu Val Tyr Lys Cys Leu Asn Ile Ser Asp Glu  
530 535 540

Leu Lys Met Ile Asp Val Pro Glu Met Asp Lys Ile Lys Gln Trp Glu  
545 550 555 560

Ser Met Phe Glu Lys His Arg Asp Leu Phe  
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&lt;210&gt; 9

&lt;211&gt; 1713

&lt;212&gt; DNA

&lt;213&gt; Lucilia cuprina

&lt;400&gt; 9

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aaagtgaaag gcgttaaacg tttaactgtg tacgatgatt cctactacag ttttgagggt 180  
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ccctgggatg gtgtgcgtga ttgttgcaat cataaagata agtcagtgcg agttgatttt 300  
ataacgggca aagtgtgtgg ctacagaggat tgtctatacc taagtgtcta tacgaataat 360  
ctaaatcccg aaactaaacg tcccggttta gtatacatatc atgggtggtgg ttttattatc 420

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aattgtgccc gtaatgccc gtttaaagat caagtcacgg ccttgcggtg gattaaaaat 600
aattggccca accttgggtg caatcccgat aatattacag tctttgggtga aagtgcgggt 660
gtgacctcta ccactacat gatgttaacc gaacaaaactc ggggtctttt ccacgtgggt 720
atactaattg cgggtaatgc tatttgtcca ttggctaata cccaatgtca acatcgtgcc 780
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gaagagcgta caaataaggt catgtttctt tttggctcca ctgttgagcc atacagacc 960
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<210> 10

<211> 570

<212> PRT

<213> *Lucilia cuprina*

<400> 10

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Cys Ile Glu Asn Lys Phe Leu Asn Tyr Arg Leu Thr Thr Asn Glu Thr  
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Val Val Ala Glu Thr Glu Tyr Gly Lys Val Lys Gly Val Lys Arg Leu  
35 40 45

Thr Val Tyr Asp Asp Ser Tyr Tyr Ser Phe Glu Gly Ile Pro Tyr Ala  
50 55 60

Gln Pro Pro Val Gly Glu Leu Arg Phe Lys Ala Pro Gln Arg Pro Thr  
65 70 75 80

Pro Trp Asp Gly Val Arg Asp Cys Cys Asn His Lys Asp Lys Ser Val  
85 90 95

Gln Val Asp Phe Ile Thr Gly Lys Val Cys Gly Ser Glu Asp Cys Leu  
100 105 110

Tyr Leu Ser Val Tyr Thr Asn Asn Leu Asn Pro Glu Thr Lys Arg Pro  
115 120 125

Val Leu Val Tyr Ile His Gly Gly Gly Phe Ile Ile Gly Glu Asn His  
130 135 140

Arg Asp Met Tyr Gly Pro Asp Tyr Phe Ile Lys Lys Asp Val Val Leu  
145 150 155 160

Ile, Asn	Ile	Gln	Tyr	Arg	Leu	Gly	Ala	Leu	Gly	Phe	Leu	Ser	Leu	Asn
					165			170					175	
Ser	Glu	Asp	Leu	Asn	Val	Pro	Gly	Asn	Ala	Gly	Leu	Lys	Asp	Gln
			180					185					190	
Met	Ala	Leu	Arg	Trp	Ile	Lys	Asn	Asn	Cys	Ala	Asn	Phe	Gly	Gly
		195					200					205		
Pro	Asp	Asn	Ile	Thr	Val	Phe	Gly	Glu	Ser	Ala	Gly	Ala	Ala	Ser
	210					215					220			
His	Tyr	Met	Met	Leu	Thr	Glu	Gln	Thr	Arg	Gly	Leu	Phe	His	Arg
225					230					235				240
Ile	Leu	Met	Ser	Gly	Asn	Ala	Ile	Cys	Pro	Leu	Ala	Asn	Thr	Gln
				245					250					255
Gln	His	Arg	Ala	Phe	Thr	Leu	Ala	Lys	Leu	Ala	Gly	Tyr	Lys	Gly
			260					265					270	
Asp	Asn	Asp	Lys	Asp	Val	Leu	Glu	Phe	Leu	Met	Lys	Ala	Lys	Pro
	275						280					285		
Asp	Leu	Ile	Lys	Leu	Glu	Glu	Lys	Val	Leu	Thr	Leu	Glu	Glu	Arg
	290					295					300			
Asn	Lys	Val	Met	Phe	Pro	Phe	Gly	Pro	Thr	Val	Glu	Pro	Tyr	Gln
305					310					315				320
Ala	Asp	Cys	Val	Leu	Pro	Lys	His	Pro	Arg	Glu	Met	Val	Lys	Thr
			325						330					335
Trp	Gly	Asn	Ser	Ile	Pro	Thr	Met	Met	Gly	Asn	Thr	Ser	Tyr	Glu
			340					345					350	
Leu	Phe	Phe	Thr	Ser	Ile	Leu	Lys	Gln	Met	Pro	Met	Leu	Val	Lys
	355						360					365		
Leu	Glu	Thr	Cys	Val	Asn	Phe	Val	Pro	Ser	Glu	Leu	Ala	Asp	Ala
	370					375					380			
Arg	Thr	Ala	Pro	Glu	Thr	Leu	Glu	Met	Gly	Ala	Lys	Ile	Lys	Lys
385					390					395				400
His	Val	Thr	Gly	Glu	Thr	Pro	Thr	Ala	Asp	Asn	Phe	Met	Asp	Leu
				405					410					415
Ser	His	Ile	Tyr	Phe	Trp	Phe	Pro	Met	His	Arg	Leu	Leu	Gln	Leu
			420					425					430	
Phe	Asn	His	Thr	Ser	Gly	Thr	Pro	Val	Tyr	Leu	Tyr	Arg	Phe	Asp
	435						440					445		
Asp	Ser	Glu	Asp	Leu	Ile	Asn	Pro	Tyr	Arg	Ile	Met	Arg	Ser	Gly
	450					455					460			

Gly Val Lys Gly Val Ser His Ala Asp Glu Leu Thr Tyr Phe Phe Trp  
 465 470 475 480

Asn Gln Leu Ala Lys Arg Met Pro Lys Glu Ser Arg Glu Tyr Lys Thr  
 485 490 495

Ile Glu Arg Met Thr Gly Ile Trp Ile Gln Phe Ala Thr Thr Gly Asn  
 500 505 510

Pro Tyr Ser Asn Glu Ile Glu Gly Met Glu Asn Val Ser Trp Asp Pro  
 515 520 525

Ile Lys Lys Ser Asp Glu Val Tyr Lys Cys Leu Asn Ile Ser Asp Glu  
 530 535 540

Leu Lys Met Ile Asp Val Pro Glu Met Asp Lys Ile Lys Gln Trp Glu  
 545 550 555 560

Ser Met Phe Glu Lys His Arg Asp Leu Phe  
 565 570

#210: 11  
 #211: P6  
 #212: DNA  
 #213: Lucilia cuprina

#400: 11  
 atgaatttca acgtagttt gatgga 26

#210: 12  
 #211: 28  
 #212: DNA  
 #213: Lucilia cuprina

#400: 12  
 ctaaaataaaa tottatgtt tttcaaac 28

#210: 13  
 #211: 570  
 #212: PRT  
 #213: Musca domestica

#400: 13  
 Met Thr Phe Leu Lys Gln Phe Ile Phe Arg Leu Lys Leu Cys Val Lys  
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Cys Met Val Asn Lys Tyr Thr Asn Tyr Arg Leu Ser Thr Asn Glu Thr  
 20 25 30

Gln Ile Ile Asp Thr Glu Tyr Gly Gln Ile Lys Gly Val Lys Arg Met  
 35 40 45

Thr Val Tyr Asp Asp Ser Tyr Tyr Ser Phe Glu Ser Ile Pro Tyr Ala  
 50 55 60

Lys Pro Pro Val Gly Glu Leu Arg Phe Lys Ala Pro Gln Arg Pro Val  
 65 70 75 80

Pro Trp Glu Gly Val Arg Asp Cys Cys Gly Pro Ala Asn Arg Ser Val  
 85 90 95

Gln Thr Asp Phe Ile Ser Gly Lys Pro Thr Gly Ser Glu Asp Cys Leu  
 100 105 110

Tyr Leu Asn Val Tyr Thr Asn Asp Leu Asn Pro Asp Lys Arg Arg Pro  
 115 120 125

Val Met Val Phe Ile His Gly Gly Asp Phe Ile Phe Gly Glu Ala Asn  
 130 135 140

Arg Asn Trp Phe Gly Pro Asp Tyr Phe Met Lys Lys Pro Val Val Leu  
 145 150 155 160

Val Thr Val Gln Tyr Arg Leu Gly Val Leu Gly Phe Leu Ser Leu Lys  
 165 170 175

Ser Glu Asn Leu Asn Val Pro Gly Asn Ala Gly Leu Lys Asp Gln Val  
 180 185 190

Met Ala Leu Arg Trp Val Lys Ser Asn Ile Ala Ile Phe Gly Gly Asp  
 195 200 205

Val Asp Asn Ile Thr Val Phe Gly Glu Ser Ala Gly Gly Ala Ser Thr  
 210 215 220

His Tyr Met Met Ile Thr Glu Gln Thr Arg Gly Leu Phe His Arg Gly  
 225 230 235 240

Ile Met Met Ser Gly Asn Ser Met Cys Ser Trp Ala Ser Thr Glu Cys  
 245 250 255

Gln Ser Arg Ala Leu Thr Met Ala Lys Arg Val Gly Tyr Lys Gly Glu  
 260 265 270

Asp Asn Glu Lys Asp Ile Leu Glu Phe Leu Met Lys Ala Asn Pro Tyr  
 275 280 285

Asp Leu Ile Lys Glu Glu Pro Gln Val Leu Thr Pro Glu Arg Met Gln  
 290 295 300

Asn Lys Val Met Phe Pro Phe Gly Pro Thr Val Glu Pro Tyr Gln Thr  
 305 310 315 320

Ala Asp Cys Val Val Pro Lys Pro Ile Arg Glu Met Val Lys Ser Ala  
 325 330 335

Trp Gly Asn Ser Ile Pro Thr Leu Ile Gly Asn Thr Ser Tyr Glu Gly  
 340 345 350

Leu Leu Ser Lys Ser Val Ala Lys Gln Tyr Pro Glu Val Val Lys Glu  
 355 360 365

Leu Glu Ser Cys Val Asn Tyr Val Pro Trp Glu Leu Ala Asp Ser Glu  
 370 375 380

Arg Ser Ala Pro Glu Thr Leu Glu Arg Ala Ala Ile Val Lys Lys Ala  
395 390 395 400

His Val Asp Gly Glu Thr Pro Thr Leu Asp Asn Phe Met Glu Leu Cys  
405 410 415

Ser Tyr Phe Tyr Phe Leu Phe Pro Met His Arg Phe Leu Gln Leu Arg  
420 425 430

Phe Asn His Thr Ala Gly Thr Pro Ile Tyr Leu Tyr Arg Phe Asp Phe  
435 440 445

Asp Ser Glu Glu Ile Ile Asn Pro Tyr Arg Ile Met Arg Phe Gly Arg  
450 455 460

Gly Val Lys Gly Val Ser His Ala Asp Glu Leu Thr Tyr Leu Phe Trp  
465 470 475 480

Asn Ile Leu Ser Lys Arg Leu Pro Lys Glu Ser Arg Glu Tyr Lys Thr  
485 490 495

Ile Glu Arg Met Val Gly Ile Trp Thr Glu Phe Ala Thr Thr Gly Lys  
500 505 510

Pro Tyr Ser Asn Asp Ile Ala Gly Met Glu Asn Leu Thr Trp Asp Pro  
515 520 525

Ile Lys Lys Ser Asp Asp Val Tyr Lys Cys Leu Asn Ile Gly Asp Glu  
530 535 540

Leu Lys Val Met Asp Leu Pro Glu Met Asp Lys Ile Lys Gln Gly Ala  
545 550 555 560

Ser Ile Phe Asp Lys Lys Lys Glu Leu Phe  
565 570

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<211> 1710  
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<213> Musca domestica

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caaattaagg gtgttaagcg aatgaccgtc tacgatgatt cttactacag tttcgagagt 180  
ataccctatg ctaagcctcc agtgggtgag ttgagattca aggcacccca gcggcctgta 240  
ccatgggagg gtgtacgtga ttgctgtggg ccagccaaca gatcgttaca gacagatttc 300  
ataagtggca aaccacaggg ttcgaggat tgtctatacc tgaatgtgta taccaatgac 360  
ttgaacccag acaaaaggcg tctgtttatg gttttcatcc atggcggaga ttttattttc 420  
ggcgaagcaa atcgtaactg gtttggtccc gactacttta tgaagaaacc cgtggtcttg 480  
gtaaccgtgc aatatcggtt ggggtgtgtt ggtttcctta gcctgaaatc ggaaaatctc 540  
aatgtccccc gcaacgctgg cctcaaggat caagtaatgg ccttgagatg ggtcaagagt 600  
aatattgcca ttttcggtgg cgatgtagac aatattaccg tcttcggcga aagtgcctgg 660  
ggggcctcaa ccattacat gatgataacc gaacagaccc gtggtttatt ccacgtgggt 720  
atcatgatgt ccggtaatcc catgtgctca tgggcctcta cagaatgcca aagtcgtgcg 780  
ctcaccatgg ccaaacgtgt tggctataag ggagaggaca atgaaaaaga tatcctggaa 840  
ttcctaataga aagccaatcc ctatgatttg atcaaaggag agccacaagt tttgacaccc 900



gaaagaatgc aaaataaggt catgttttct tttggaccca ctgtagaacc ataccagaca 960  
 gccgactgtg tggtagccaa accaatcaga gaaatgggtga agagcgctg gggaaattcg 1020  
 ataccacat tgataggcaa tacctcctac gaaggtttgc tttccaaatc aattgccaaa 1080  
 caatatccgg aggtttgtaaa agagtgtgaa tctgtgtga attatgtgoc ttgggagttg 1140  
 gctgacagtg aacgcagtgc cccggaaaacc ctggagaggg ctgccattgt gaaaaaggcc 1200  
 catgtggatg gggaaacacc tactctggat aattttatgg agctttgtgc ctatttttat 1260  
 tctctctcc ccatgcctgc ctctctacaa ttgcgcttca accacacagc tggcactccc 1320  
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 cgtttttggcc gtgggttaa aggtgtgaagc catgcctgat agctaaccct tctctctctg 1440  
 aacattttgt cgaacgcct gccaaaaggaa agccgcgaat acaaaaccat tgaacgcctg 1500  
 gttggcattt ggaacggaatt cgcacaccac gccaaaaccat acagcaatga tatagccggc 1560  
 atggaaaacc tcaactggga tcccataaaa aaatccgatg atgtctataa atgttttaaa 1620  
 atcggcgatg aattgaaagt tatggatttg ccagaaatgg ataaaattaa acaatgggca 1680  
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<210> 15

<211> 207

<212> PRT

<213> Musca domestica

<400> 15

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Val Met Val Phe Ile His Gly Gly Gly Phe Ile Phe Gly Glu Ala Asn  
 35 40 45

Arg Asn Trp Tyr Gly Pro Asp Tyr Phe Met Lys Lys Pro Val Val Leu  
 50 55 60

Val Thr Val Gln Tyr Arg Leu Gly Val Leu Gly Phe Leu Ser Leu Lys  
 65 70 75 80

Ser Glu Asn Leu Asn Val Pro Gly Asn Ala Gly Leu Lys Asp Gln Val  
 85 90 95

Met Ala Leu Arg Trp Phe Lys Ser Asn Ile Ala Ile Phe Gly Gly Asp  
 100 105 110

Val Asp Asn Ile Thr Val Phe Gly Glu Ser Ala Gly Gly Ala Ser Thr  
 115 120 125

His Tyr Met Met Ile Thr Glu Gln Thr Arg Gly Leu Phe His Arg Gly  
 130 135 140

Ile Met Met Ser Gly Asn Ser Met Cys Ser Ser Ala Ser Thr Glu Cys  
 145 150 155 160

Gln Ser Arg Ala Leu Thr Met Ala Lys Arg Val Gly Tyr Lys Gly Glu  
 165 170 175

Glu Asn Glu Lys Asp Ile Leu Glu Phe Leu Met Lys Ala Asn Pro Tyr  
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Asp Leu Ile Lys Glu Glu Pro Gln Val Leu Thr Pro Glu Arg Met

<210> 16  
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 <212> DNA  
 <213> Lucilia cuprina

<400> 16  
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<210> 17  
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<400> 17  
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<210> 18  
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<400> 18  
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<210> 19  
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<210> 21  
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<400> 21  
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<210> 22  
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<210> 23  
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• <400> 23  
tcccaaacga tattgtatgt t 21

<210> 24  
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<400> 24  
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<210> 25  
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<400> 25  
ccgaggatgt ttgggtaaga c 21

<210> 26  
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<400> 26  
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<210> 27  
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<400> 27  
acgcgattct ttaggcatac g 21

<210> 28  
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<400> 28  
tgtgtgctct acccaactaca t 21

<210> 29  
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<213> Lucilia cuprina

<400> 29  
cctgtggctt ggctttcata a 21

<210> 30

<211> 35  
<212> DNA  
<213> Artificial Sequence

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Primer

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<223> i

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<210> 31  
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Primer

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<212> DNA

<213> Musca domestica

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22

<210> 33

<211> 34

<212> DNA

<213> Musca domestica

<400> 33

tgcacttat gaaatctgtc tgta

24

<210> 34

<211> 24

<212> DNA

<213> Musca domestica

<400> 34

tacatgatga taaccgaaca gacc

24

<210> 35

<211> 23

<212> DNA

<213> Musca domestica

<400> 35

togattattt gggtttcatt tgt

23

<210> 36

<211> 21

<212> DNA

<213> Musca domestica

<400> 36

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<211> 21

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<400> 38

attcgatacc cacattgata g 21

<210> 39

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<210> 40

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<212> DNA

<213> Musca domestica

<400> 40

atgacttttc tgaagcaatt cat 23

<210> 41

<211> 23

<212> DNA

<213> Musca domestica

<400> 41

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<212> DNA

<213> Musca domestica

<400> 42

ggcatggaaa acctcacctg g 21

<210> 43

<211> 207

<212> PRT

<213> Lucilia cuprina

<400> 43

Gln Val Asp Phe Ile Thr Gly Lys Val Cys Gly Ser Glu Asp Cys Leu

1

5

10

15

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Val	Leu	Val	Tyr	Ile	His	Gly	Gly	Gly	Phe	Ile	Ile	Gly	Glu	Asn	His	35	40	45	
Arg	Asp	Met	Tyr	Gly	Pro	Asp	Tyr	Phe	Ile	Lys	Lys	Asp	Val	Val	Leu	50	55	60	
Ile	Asn	Ile	Gln	Tyr	Arg	Leu	Gly	Ala	Leu	Gly	Phe	Leu	Ser	Leu	Asn	65	70	75	80
Ser	Glu	Asp	Leu	Asn	Val	Pro	Gly	Asn	Ala	Gly	Leu	Lys	Asp	Gln	Val	85	90	95	
Met	Ala	Leu	Arg	Trp	Ile	Lys	Asn	Asn	Cys	Ala	Asn	Phe	Gly	Gly	Asn	100	105	110	
Pro	Asp	Asn	Ile	Thr	Val	Phe	Gly	Glu	Ser	Ala	Gly	Ala	Ala	Ser	Thr	115	120	125	
His	Tyr	Met	Met	Leu	Thr	Glu	Gln	Thr	Arg	Gly	Leu	Phe	His	Arg	Gly	130	135	140	
Ile	Leu	Met	Ser	Gly	Asn	Ala	Ile	Cys	Pro	Leu	Ala	Asn	Thr	Gln	Cys	145	150	155	160
Gln	His	Arg	Ala	Phe	Thr	Leu	Ala	Lys	Leu	Ala	Gly	Tyr	Lys	Gly	Glu	165	170	175	
Asp	Asn	Asp	Lys	Asp	Val	Leu	Glu	Phe	Leu	Met	Lys	Ala	Lys	Pro	Gln	180	185	190	
Asp	Leu	Ile	Lys	Leu	Glu	Glu	Lys	Val	Leu	Thr	Leu	Glu	Glu	Arg	195	200	205		